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Mild cognitive impairment

Mild cognitive impairment: a concept useful for early detection and intervention of dementia

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As life expectancy increases around the globe, dementia has become an increasingly important public health issue that has created new challenges for communities' social service networks[1]. The early detection and prevention of dementia, particularly Alzheimer's disease (AD), necessitate the development of effective public health education programs about the early symptoms and preclinical changes of dementia. To promote this effort the concept of mild cognitive impairment (MCI) – which some experts consider an early form of AD – has been created. Despite tremendous progress over the last 20 years in understanding the neuropsychological, neuroimaging, and neurobiological characteristics of MCI, there remains controversy about the value of this construct.[2] Despite the problems of proving that MCI is a distinct disease entity, we contend that this clinical construct plays a crucial role in addressing the public health challenges of dementia that exist in contemporary societies.

First, MCI is strongly related to dementia, especially AD. Studies in China and other countries have consistently found that elderly people with MCI are much more likely to develop dementia than those without MCI.[3] The cognitive regression and the patterns of cerebral atrophy in elderly persons with MCI are similar to those seen in individuals with AD, and the similarity is most pronounced in individuals with MCI who subsequently develop AD.[4] Brain imaging studies indicate that the structural and functional changes found in the brains of elderly persons with MCI are intermediate between those in normal elderly people and in elderly individuals with AD.[5]

Second, interventions for persons with MCI can improve brain functioning. Cognitive or memory training can improve memory functioning in elderly people with MCI.[6,7] Neuroimaging studies have shown that cognitive training can enhance brain activity in the frontal, temporal, and parietal areas.[8] And several randomized controlled trials have found that specific Chinese traditional medicines can reduce the transition from MCI to AD.[9,10]These findings suggest that brain plasticity is preserved in elderly people with MCI and, thus, suggest that targeted interventions should be able to improve the cognitive functioning of individuals with MCI.

Lastly, the recognition of MCI can help in the early detection of dementia. Recent diagnostic criteria of AD and MCI[11,12] stress the value of pathological biomarkers including the neurotoxic β-amyloid protein (Aβ) and tau protein which either directly damage neurons or are the indicators of damaged neurons. Subsequent research focused on these biomarkers hold the promise of substantially improving the prevention and management of AD.[13] Research on the sensitivity and specificity of these biomarkers may find that their occurrence in individuals with MCI is predictive of progression to AD and, thus, merits more intensive follow-up and treatment. And if drugs targeting Aβ or tau protein prove effective, screening for these biomarkers in persons with MCI will identify those who are responsive to treatment and, thus, can prevent the progression to AD in these individuals.

In clinical practice the use of cognitive tests to screen for MCI may be more feasible than the routine assessment of biomarkers. Several instruments from

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high-income counties (e.g the Montreal Cognitive Assessment [MoCA][14]) have been translated and adapted for use in China. But not all such screening tools are appropriate for use in mainland China where the cultural and educational background of the elderly, particularly those from rural areas, is quite different from that of the elderly in high-income countries. Thus, we designated a patent screening tool, the Screening Scale for Mild Cognitive Impairment (ZL201010508406.2) [15] which might overcome the problem and is more appropriate to use with Chinese elderly. Cultural and lifestyle factors also play a role in the adaptation of the cognitive training programs for elderly persons with MCI that have been primarily developed in high-income countries. It will also be important to develop China-specific programs for promoting life styles in the elderly that are conducive to brain health and the prevention of dementia.

In summary, active research about the identification of MCI and about different interventions for persons with MCI is one of the most promising avenues that communities around the world have for facing the tremendous public health challenge of AD.

Conflict of interest

The authors reports no conflictof interest related to this manuscript.

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